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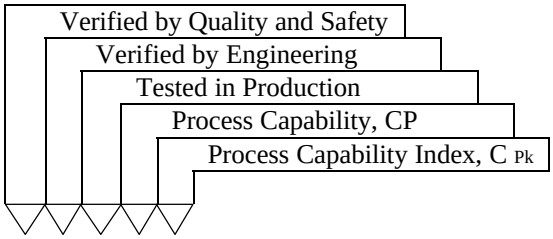


## 1. SCOPE

The purpose of this document is to specify the functional requirements of a 100W continuous, dual input, quad output switching power supply in an open frame board mount package.

## 2. CONNECTIONS

The following will specify the input and output connections provided by the power supply.

2.1 INPUT CONNECTOR
Molex 3 position, 0.156 center header

2.2 OUTPUT CONNECTOR
Molex 12 position 0.156 center header

2.3 PIN ASSIGNMENTS

| INPUT (J1) | **OUTPUT (J2)** | **OUTPUT (J2)** | **OUTPUT (J2)** |
|---|---|---|---|
| Pin 1 - Line | Pins 1-4, +V1 | Pins 9-10, +V2 | Pin 12, -V4 |
| Pin 2 - Neutral | Pins 5-8, Gnd | Pin 11, -V3 | |

## 3. ELECTRICAL REQUIREMENTS

This section defines the electrical requirements for the power supply unit.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | 3.1 | INPUT<br>The operating conditions for the AC input are described in this section. |
| X | X | X | 6.3 | 5.9 | | 3.1.1 | INPUT VOLTAGE<br>The operating range is: 90-264 VAC, single phase. |
| X | X | X | 3.6 | 3.6 | | 3.1.2 | INPUT CURRENT<br>When the input voltage is 90VAC at 100W, then the max input current shall be 2.4A. |
| X | X | | | | | 3.1.3 | INPUT FREQUENCY<br>Input frequency range shall be 47 – 63 Hz. |
| X | X | | | | | 3.1.4 | INRUSH CURRENT<br>Maximum inrush shall be 35A at 264VAC. |
| X | X | X | 1.5 | 1.4 | | 3.1.5 | EFFICIENCY<br>The efficiency of the power supply is 86% typical. Measured at 5V @ 11 Amps and 16V @ 3.0 Amps nominal AC input voltage (230V), 25°C with five minute warm-up. |
| | | | | | | 3.2 | OUTPUT<br>The operating conditions for the DC output are described in this section. |
| X | X | | | | | 3.2.1 | OUTPUT POWER<br>The power supply will provide four output. The continuous output power is 100W. |
| X | X | X | .44 | .25 | | 3.2.2 | OUTPUT VOLTAGE<br>Initial setting tolerance is measured with 50% of maximum load on all outputs, with line voltage set at nominal. The voltage and initial setting tolerance of each output will be provided as follows:<br>(Temporary guard band in place on V set (V1) is 20 mv at production test.) |

| **OUTPUT** | **NOMINAL VOLTAGE** | **INITIAL SET TOLERANCE** |
|---|---|---|
| +V out(1) | +5.1VDC | +/-2% |
| +V out(2) | +16VDC | +/-5% |
| -V out(3) | -4.8VDC | +/-5% |
| -V out(4) | -15.5VDC | +/-5% |

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X | X | X | | | | 3.2.3 | OUTPUT CURRENT<br>Total output power not to exceed 100W free air convection. Rating of output currents are listed as follows: |

| OUTPUT | MIN. OUTPUT CURRENT | MAX. OUTPUT CURRENT |
|---|---|---|
| +V out(1) | 3A | 12A |
| +V out(2) | 0.1 A | 3.0A |
| -V out(3) | 0 A | 0.8A |
| -V out(4) | 0 A | 0.8A |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 3.2.4 | OUTPUT REGULATION | |
| X | X | X | 6.3 | 5.9 | | 3.2.4.1 | LINE REGULATION<br>Measured by varying the line voltage from 90 - 132VAC/175 - 264VAC. |

| OUTPUT | TOLERANCE |
|---|---|
| +Vout(1) | 0.3% |
| +Vout(2) | 0.3% |
| -Vout(3) | 0.3% |
| -Vout(4) | 0.3% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X | X | X | 3.2 | 2.5 | (5 Volts) | 3.2.4.2 | LOAD REGULATION<br>Measured by varying the load current from minimum to maximum load at nominal AC input voltage. All other outputs set to 20% of full load. Measured at motherboard, 500 ms settling. |
| X | X | X | 1.2 | .97 | (12 Volts) | | |

| OUTPUT | TOLERANCE |
|---|---|
| +Vout(1) | ± 1.0 % |
| +Vout(2) | ± 5.0 % |
| -Vout(3) | ± 5.0 % |
| -Vout(4) | ± 5.0 % |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X | X | X | | | | 3.2.5 | OUTPUT RIPPLE AND NOISE VOLTAGE<br>The maximum allowable ripple and noise are as follows, measured at 50Hz and 60Hz: (5 minute warm up with 0.1uf bypass at measurement point.) |

| OUTPUT | MV |
|---|---|
| +Vout(1) | 50 |
| +Vout(2) | 150 |
| -Vout(3) | 100 |
| -Vout(4) | 150 |

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X | X | | | | | 3.2.6 | OUTPUT TRANSIENT RESPONSE<br>The load current of measured output is changed from 50% to 100%. The recovery time is measured when the output voltage has recovered to within 1% of the load regulation band. All untested outputs are at 50% load, with nominal line voltage. |

| OUTPUT | RECOVERY TIME | MAXIMUM EXCURSION |
|---|---|---|
| +Vout(1) | 1 ms | 10% |
| +Vout(2) | 1 ms | 5% |
| -Vout(3) | 1 ms | 1% |
| -Vout(4) | 1 ms | 1% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | X | | | | | 3.2.7 | OUTPUT VOLTAGE DRIFT<br>Long-term output voltage drift over 1000 hours of the Vout(1) output operation is typically 0.5%. |
| X | X | | | | | 3.2.8 | OUTPUT OVERSHOOT<br>The overshoot voltage as a percentage of nominal output voltage at start-up is as follows: I OUT = 8 Amps, measured on V1 only. |

| OUTPUT | OVERSHOOT |
|---|---|
| +Vout(1) | 10% |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 3.2.9 | OUTPUT PROTECTION<br>The power supply will be provided with protection against any fault condition described below and will self-recover with a maximum restart of 6 seconds after the fault condition is removed. | |
| X | X | | | | | 3.2.9.1 | OVERVOLTAGE<br>SCR crowbar at 5.8 volts. | |
| X | X | | | | | 3.2.9.2 | OUTPUT SHORT CIRCUIT<br>The power supply will be protected against output short circuit. RMS short circuit shabe less than 0.5 A RMS under all conditions. Output voltage of less than 0.5V constitutes a short | |
| X | X | | | | | 3.2.10 | RISE TIME<br>The rise time from 10% to 90% of output voltage is typically: | |

| OUTPUT | RISE TIME |
|---|---|
| +Vout(1) | 50 mS |
| +Vout(2) | 50 mS |
| -Vout(3) | 50 mS |
| -Vout(4) | 50 mS |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X | X | | | | | 3.2.11 | TURN-ON DELAY<br>The turn-on delay time of the main output after AC power is applied from a cold condition is 5.0 seconds MAX at 115 VAC. |

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X | X | | | | | 3.2.12 | OUTPUT HOLD-UP TIME<br>The power supply shall maintain the output within voltage/current specifications after loss of input power for 10 milliseconds typically at full rated load and at nominal AC input voltage (115VAC). |
| | | | | | | 3.2.13 | REMOTE SENSE<br>N/A |
| X | X | | | | | 3.2.14 | POWER FAIL<br>1.5 ms typical warning at all line conditions,90 % load (V1 @ 11A, V2 @ 3A.) |
| | | | | | | 3.2.15 | TEMPERATURE COEFFICIENT<br>Temperature coefficient over entire operating temperature range of 0ºC to 40ºC after one-hour warm-up will be as follows, measured on V1 only: |

| OUTPUT | COEFFICIENT |
|---|---|
| +Vout(1) | 2.4mV/°C |

**4. ENVIRONMENTAL REQUIREMENTS**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X | X | | | | | 4.1 | TEMPERATURE<br>Operating temperature range: 0ºC to 50ºC at the full rated output power. Non-operating temperature range: -40ºC to +85ºC. |
| | | | | | | 4.2 | ALTITUDE<br>Maximum operating altitude: 10,000 feet. Maximum Non-operating altitude: 40,000 feet. |
| X | X | | | | | 4.3 | HUMIDITY<br>Non-condensing relative humidity range: 5% to 95%. |
| | X | | | | | 4.4 | VIBRATION<br>3 orthogonal axes, random vibration 10min. test, 2.4 GRMS, 5Hz-500Hz. |
| X | X | | | | | 4.5 | INPUT TRANSIENT SUSCEPTIBILITY<br>The unit shall comply to the requirements of IEC 1000-4-2, 1000-4-3 and IEC 1000-4-4. |

**5. SAFETY REQUIREMENTS**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X | X | | | | | 5.1 | DIELECTRIC WITHSTAND VOLTAGE<br>Minimum dielectric withstand voltage: Input to output - 2121VDC / minute. |
| X | X | | | | | 5.2 | INSULATION RESISTANCE<br>Minimum insulation resistance: Input to output - 7 mega ohm. |
| X | X | | | | | 5.3 | LEAKAGE CURRENT<br>Leakage current from line to ground shall be 500uA maximum. |
| X | X | | | | | 5.4 | SAFETY SPACINGS<br>The PCB spacing will comply with the Safety Standards per 5.5. |
| X | X | | | | | 5.5 | SAFETY STANDARDS<br>The power supply will meet Class 1, SELV of the following safety agency requirements:<br>IEC 950, EN60950, with the following deviations:<br>VDE.<br>UL 1950 (Recognized Component)<br>C-UL (Canadian Approval by UL) |
| | | | | | | 5.6 | RELIABILITY |
| | | | | | | 5.6.1 | MTBF @ 25ºC shall be 200,000 hours minimum. |

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**6. EMI REQUIREMENTS**

The power supply shall comply to the limits CISPR 55022 and CISPR 55014, Level B (at 230 VAC and 115 VAC). FCC 47 CFR Part 15, Level B (115 VAC)

**7. APPLICABLE DOCUMENTS**

Audit Test Program
Production 1 Test Program
Production 2 Test Program
QC Test Program

**8. MECHANICAL**

8.1 WEIGHT

8.1.1 Board and Heatsink: 10oz. MAX

8.2 DIMENSIONS

8.2.1 Board and Heatsink: